Algebra 1-2 Name: _____

FACTORING POLYNOMIALS

IMPORTANT: **Always look to factor the GCF of all terms first**

# OF TERMS	FACTORING TECHNIQUE		EXAMPLE
2 or more	**G**reatest **C**ommon **F**actor (of all terms) "Reverse Distribution" → Divide out GCF, so GCF(+)		$3x^3 + 6x^2 - 15x =$
4 or more	Factoring by Grouping Parentheses or **"Box Method"**	$ax + bx + ay + by$ $= x(a + b) + y(a + b)$ $= (a + b)(x + y)$	$3xy - 6y - 5x + 10$
2	Difference of Squares	$a^2 - b^2 = (a + b)(a - b)$ [Take square roots]	$4x^2 - 25 =$
3	$x^2 + bx + c$ **"ac 7 b-Method"**	$x^2 + bx + c = (x + m)(x + n)$, when $m + n = b$ and $mn = c$ [factors of c]	$x^2 - 9x + 20 =$
3	$ax^2 + bx + c$ **"ac 7 b-method"** then grouping (or GCF shortcut)	$ax^2 + bx + c = ax^2 + mx + nx + c$, where $mn = ac$ and $m + n = b$. Then use factoring by grouping.	$6x^2 - x - 2 =$
3	Perfect Square Trinomial	$a^2 + 2ab + b^2 = (a + b)^2$ $a^2 - 2ab + b^2 = (a - b)^2$	$x^2 + 6x + 9 =$ $4x^2 - 4x + 1 =$

Algebra 1-2
FACTORING POLYNOMIALS

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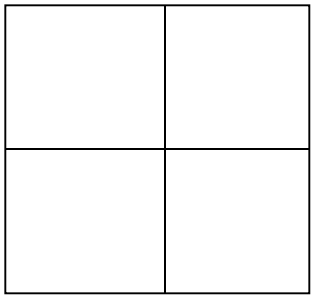
Graphic Organizers used to factor...

Box Method (Grouping – 4 terms)

$3xy - 6y - 5x + 10$

- Factor out GCF in each row and column
- Take out (-) if top of column or left of row



7-Method (Trinomials): Always factor out *GCF first*, if able

[a = 1 Easy]

$x^2 - 9x + 20 = (\quad)(\quad)$

a = **b =** **c =**

ac =

b =

( )( ) = [ac]
( ) + ( ) = [b]

[a ≠ 1 Harder "Shortcut"]

$6x^2 - x - 2 = (\quad)(\quad)$
"ax" "ax"

ac = *Divide by GCF*

b =

( )( ) = [ac]
( ) + ( ) = [b]

Steps to solve for x when polynomial = 0

1. Move all terms to one side of equation.
2. Factor out the GCF (if there is one).
3. Factor using any other applicable techniques
   a. i.e. $(x + m)(x + n) = 0$
4. Use **zero product property** so $x + m = 0$ and $x + n = 0$
5. Solve for x: $x = -m$ and $x = -n$

Example: $x^2 + 80 = 18x$